Aquatic grass communities are important in Chesapeake Bay

- Food for waterfowl
- Increase water clarity
- Habitat for blue crabs

Good water clarity – Poor water clarity
Aquatic grass are good indicators

- Widespread distributions
- Responsive to perturbations (high light requirements)
- Integrative of environmental conditions
- Important ecological role

Aquatic grass = canary in Chesapeake Bay
Aquatic grass communities are widely distributed in Chesapeake Bay.

- Zostera marina ‘eelgrass’ in York River
- Ruppia maritima ‘widgeongrass’ in St Mary’s River

Sources: VIMS & Maryland DNR
Aquatic grass communities determined by salinity

- **Low salinity** (12 species)
  - Hydrilla
  - Eurasian watermilfoil
  - Widgeon grass

- **Medium salinity** (6 species)
  - Ruppia maritima
  - Redhead grass

- **High salinity** (2 species)
  - Zostera marina
  - Eelgrass

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After Moore et al. 2000

Low salinity aquatic grass community
Medium salinity aquatic grass community
High salinity aquatic grass community
Bay wide aquatic grass loss

1933

1963

1965 1980

1984-2003

Restoration Goal (185,000 acres by 2010)

*Note – Hatched area of bar includes estimated additional acreage. No survey in 1992
Source: Chesapeake Bay Program
Annual aquatic grass monitoring using aerial photography

- Annual monitoring project (1978, 1984-present)
- 173 flight lines (2,340 mi)
- 2,033 B/W aerial photographs
- Scale 1:24,000
Photographs are converted to maps by VIMS and ground truthed

- Diamonds show ground truth sites, where species are recorded
- Density is also estimated from photographs
Species composition provided by field observations

- Approximately 1000 observations per year
- Over 17,000 observations in total
- Participants:
  - Research programs
  - Bay managers
  - Charter boat captains
  - “SAV Hunt”
Aquatic grass in 2004

Total area:
- Increased compared to 2003
- Still less than that recorded in 2002
But…
still a long way from the restoration goal

Aquatic grass area (Acres x 1000)

2010 restoration goal

Year

Not all community types and regions of the Bay respond the same.
Susquehanna flats: largest increase in aquatic grass area

1989 2004

Area of aquatic grass (ha)

Year

Low salinity responsive: rapid loss and recovery

1997: Large aquatic grass bed

2002: Complete die-off

2004: Recovering

Eastern Neck Narrows
High salinity: Slow to recover from Hurricane Isabel

June 2003
Aquatic grass

June 2004
Aquatic grass loss and no recovery

York River – Allens Island

Hurricane Isabel
September 2003
What to expect in 2005:
Forecasting aquatic grass changes
What is an ecological forecast?

- Analogous to a weather forecast - predict conditions in the future
- Predict the effects of biological, chemical, physical, and human-induced changes on ecosystems
- Do not guarantee what is to come - they offer scientifically sound estimations of what is likely to occur
Why make an ecological forecast?

- Provide context for understanding summer conditions
- Provide guidance for Chesapeake restoration efforts
- Establish a proactive communication and education program
- Aid management activities
2005 Aquatic grass forecast

**Community type**
- **Low salinity** (12 species)
- **Medium salinity** (6 species)
- **High salinity** (2 species)

**Locations where community types occur**

**20 years of aquatic grass cover**

- **Overall increase in area**
- **No overall change expected**
- **Small overall increase in area**

**2005 forecast**
Methods

• 20 years of bay-wide survey data
• Spring water quality
• Previously established relationships
• Expert interpretation and analysis
Keeping track

• Field observations made by scientist and restoration experts

• Actual conditions compared to the forecast

• Any deviations from forecast explained on website

– www.chesapeakebay.net/bayforecast.htm
Restoration aims to improve conditions

- **Improving water quality**
  - Agriculture best management practice
  - Sewage treatment plant upgrades
  - Stream corridor restoration

- **Planting aquatic grass**
  - Adult plants
  - Seeds

Northern Bay point source nutrient loads
An example of successful long term survival of aquatic grass transplants

1984 1985 1987

York River
Aquatic grass conclusions

• An overall increase in 2004 compared to 2003
• Most increases occurred in low salinity regions
• Significant increases still required to meet restoration goal
• 2005 forecast:
  - Continued increases in low salinity regions
  - High salinity community recovering from Hurricane Isabel